U.S. Department of Homeland Security

Science and Technology Directorate
Border, Immigration and Maritime Division

Request for Information (RFI) No. 70RSAT19RFI000004

"Robotic Communications Technologies"

THIS IS A REQUEST FOR INFORMATION (RFI) ONLY that is being issued in accordance with Federal Acquisition Regulation (FAR) 15.201(e). This RFI is issued solely for information and planning purposes. It does not constitute a solicitation, such as a Request for Proposal (RFP), or a promise to issue an RFP or Broad Agency Announcement (BAA). This RFI does not commit the Department of Homeland Security Science and Technology Directorate (DHS S&T) to contract for any supplies or services. DHS S&T is not, at this time, seeking proposals. Responders are advised that S&T will not pay any cost incurred in responding to this RFI. All costs associated with responding to this RFI will be solely at the interested party's expense. Not responding to this RFI does not preclude participation in any future RFP or BAA. The information provided in this RFI is subject to change and is not binding on S&T. All submissions become the property of S&T, and will not be returned.

1. BACKGROUND:

This Request for Information from the Department of Homeland Security Science and Technology Directorate seeks technologies, products, and research evidence for information and planning purposes. The information submitted, as a result of this RFI, will be used in assessing the state-of-the-art in robotic communications technologies for supporting DHS S&T Border, Immigration and Maritime Division's (BIM's) research and development (R&D) efforts. Responses to this RFI may be used to develop an invitation list for a Demonstration and Evaluation Exercise in Arizona to be held August 5-10, 2019.

DHS S&T is interested in evaluating robotic communication capabilities to characterize underground structures, contents, threats, and obstacles along the U.S. southern border. These environments range in size and shape, but are all characterized by lack of GPS-signal, short distance (less than 50 meters) line of sight, and a variety of building materials. Robotic communication capabilities are required to provide command and control connectivity, as well as video and data transfer, with remote assets.

DHS S&T will assess state-of-the-art in robotic communication capabilities by hosting a by invitation-only Demonstration and Evaluation Exercise on August 5-10, 2019 at a location in Arizona. This event is intended to evaluate current robotics performance against a defined set of DHS S&T capability needs in a variety of mission scenarios. Participants in the exercise are expected to provide equipment and testing support to showcase capabilities during the event. Cooperative Research and Development Agreements (CRADAs) will be entered into with each participant prior to the exercise. The CRADA will delineate both contractor and Government responsibilities as it pertains to the Demonstration and Evaluation Exercise. This RFI is being used to capture interest in participation in such an event, and data related to potential technologies for evaluation.

2. OBJECTIVE:

DHS S&T is seeking technologies that are offered as off-the-shelf solutions that enable communications in a robotics architecture that could be deployed in a wide range of border environments and missions. Technology providers with applicable solutions are encouraged to respond to this RFI, even if the responder is not interested in participating in the Demonstration and Evaluation Exercise. Providers may be component suppliers or full-system solution providers who have taken a systems integration approach to robotics communications.

Responses should focus on technologies that are immediately ready for field trials. DHS S&T may use the results from this RFI and the Demonstration and Evaluation Exercise to develop a potential robotics communication technology acquisition program that will be open to all capable sources, not just participants who respond to this RFI. Further, DHS S&T may use the responses from this RFI for future inquiries, invitations to participate in related events, and other opportunities not yet defined.

DHS S&T is interested in a wide range of robotics communication capabilities to support border environment investigations. Technology submissions under this RFI may include properly marked proprietary information, but are NOT to include “Classified” information. Submissions to this RFI will remain with the government and not released for public consumption.

DHS S&T is considering fielding robotics communications technologies through this program; therefore maturity and usability of the technologies are critical.

The Technical Areas of Interest listed below include the following areas of command and control capabilities, system performance, video capture and transfer, and mission execution:

Robotics Underground Communication - Technical Areas of Interest	
Autonomous navigation in known and unknown environments	Robot-to-robot communications in close proximity and over larger distance (1 mile)
Navigation and localization in GPS-absent environments	Virtual/augmented reality robot control interfaces
Robotic mobility across multiple surfaces	Robotic situational assessment -- environment characterization, localization, mission intent
Mapping, modeling, and visualization of the operating environment	Near-real time object recognition in video and still images
Non-line of sight, low latency, continuous communications in a constrained environment	Robotic package delivery and retrieval
Command and control communications in GPS-absent environments	Human-robot teaming in near proximity (<10 feet)
Video streaming in intermittent communication conditions	Two-way voice, data, and video communications in an ***underground*** environment with no existing infrastructure

After the RFI closes, DHS S&T will invite selected participants to participate in the Demonstration and Evaluation Exercise. This event will provide DHS S&T awareness of technology capabilities in an operational test scenario. DHS S&T will not provide funding for participation in the exercise, However, DHS S&T will enter into CRADAs for collaborating with other exercise participants.

The Demonstration and Evaluation Exercise is scheduled for August 5-10, 2019 at a location in Arizona.

Responses are requested from all capable sources including, but not limited to: private or public companies, individuals, universities, university-affiliated research centers, not-for-profit research institutions, foreign entities, and U.S. Government-sponsored laboratories.

3. RESPONDING TO THIS REQUEST FOR INFORMATION:

Responders should submit a single response that summarizes each technology that relates to the Technical Areas of Interest described above. Each organization may only submit one technology summary. Each technology summary is limited to three (3) pages, with no animation, no large graphics, and must include the **Organizational Summary** information and the applicable **Robotic Communications Technology Description** content stated below. The Organizational Summary and Technology description are part of the 3-page limit. Remaining page space can be

utilized for detailed technology descriptions and highlights. If an organization elects to describe multiple technologies, they must be compiled into the same single 3-page organizational response. Any submitted material in excess of this limitation will not be reviewed. DHS S&T will only review responses submitted in PDF format. All responses must be in written English.

Respondent's Organizational Summary	
Company Name	
Primary POC	
POC's Email	
POC's Phone	
Technology/Product Name(s)	
Web-link	URL for product/technology
Technology Type	Integrated Robotics System Solution, Component Communications, Others
Capability Enabled by the Technology	What does this technology enable, as related to the Technical Areas of Interest or another relevant capability? (50 word limitation)
Relevancy Description	How is this technology relevant to DHS S&T robotics integration to support investigation of underground border environments? (1/2 page limitation)
Picture(s)	

Robotic Communications Technologies	
Description:	
Feature	**Description**
Type	MANET, LTE, Through the Earth, other
Frequency band	_____ MHz / GHz
Prior Experience with DHS	yes / no
Prior Robotics Integration?	yes / no
Base Station Description	
- weight	_____ (lbs/kg)
- footprint size	_____ (sq ft)

Mobile / Remote Component Description		
- weight	_____ (lbs/oz)	
- component size	_____ (sq in / cm)	
- antenna size	_____ (in/cm)	
Line of Sight (LOS) Range	_____ (meters / feet)	
Non-LOS Range: Probability of Connectivity		
- 10m	High / Medium / LOW	
- 50m	High / Medium / LOW	
- 100m	High / Medium / LOW	
- 1000m+	High / Medium / LOW	
Power Performance	Minimum	Maximum
- Transmit Power	_____ W	_____ W
- 2 way voice	yes / no , latency ___ sec	yes / no , latency ___ sec
- data transfer rate	_____ Mbps, latency ___ sec	_____ Mbps, latency ___ sec
- video transfer rate	_____ Mbps, latency ___ sec	_____ Mbps, latency ___ sec
- localization (no-GPS)	yes / no	yes / no
- scalable with repeaters	yes / no / n/a	yes / no / n/a

Robotics	
Description:	
Feature	**Description**
Type	Air / Ground / Hybrid / Other
Prior Experience in Underground Environment	yes / no
Prior Experience with DHS	yes / no
Endurance on 1 battery	_____ minutes
Size	
- dimensions	length x width x height
- weight	_____ (lbs/kg)
Level of Autonomy	
- 0 - None	yes / no
- 1 - Operator Assistance	yes / no
- 2 - Partial Automation	yes / no
- 3 - Conditional Automation	yes / no
- 4 - High Automation	yes / no

- 5 - Full Autonomy	yes / no
Line of Sight (LOS) Range to Base Station	_____ (meters / feet)
Non-LOS Range: probability of connectivity	
- 10m	High / Medium / LOW
- 50m	High / Medium / LOW
- 100m	High / Medium / LOW
- 1000m+	High / Medium / LOW

The contact information should include the responder's primary point of contact (name and e-mail address) who can communicate regarding potential clarification discussions.

Responses shall be submitted in Times New Roman font with a 12-pitch font. All proprietary information, performance capabilities, and/or future modification(s) should be clearly identified and marked. By submitting a response, per the RFI, the submitter understands and grants consent to DHS for the assessment team and associated DHS support contractors to gain access to the submissions. Please be advised that all submissions become Government property and will not be returned, and that all support contractors have signed non-disclosure agreements with the government.

Method of Submission: One electronic submission in PDF format. The electronic submission shall not be locked protected so as to prevent copying and mark-up of information.

Responses to the RFI shall be submitted electronically to DHS S&T at robotcomms@hq.dhs.gov. You must include the RFI Number (DHS 70RSAT19RFI000004) and RFI Title in the subject line of your email. Submissions shall be received no later than 5:00 pm, U.S. Eastern Daylight Time, July 17, 2019.

DHS reserves the right to review late submissions, but makes no guarantee for review of late submissions. Respondents are solely responsible for any and all expenses incurred pursuant to responding to this RFI. Responses to the RFI may be used to develop Government documentation. Unsolicited proposals in response to this RFI will not be considered.

RFI Response Assessment Criteria

The received responses will be evaluated against the Technical Areas of Interest shown in the table in Section 2. The Government will evaluate responses received against these technical areas to see if the presented technology meets any of the criteria specified in the table. Those selected for participation in the Demonstration and Evaluation exercise should be prepared to enter into a CRADA with the Government.
Note: The Demonstration and Evaluation exercise is a demonstration of robotics technology capabilities and, therefore, is no guarantee of a future contract between DHS S&T and selected suppliers.

4. GOVERNMENT PLANS:

This RFI is issued solely for market research, planning, and information purposes and is not to be construed as a commitment by the Government to issue a subsequent solicitation (Broad Agency Announcement, Request for Proposal, etc.).

5. CLASSIFIED SUBMISSION:

Submission will be accepted for unclassified systems only. Any classified information regarding any proposed system shall be omitted from the responses to this RFI. Limit your responses to the RFI to Sensitive Security Information (SSI), proprietary or unrestricted information; and mark submissions appropriately. SSI submissions can be submitted by password protecting the document, and then sending the password separately to the Mailbox.

The following is an abbreviated description of SSI:

"SSI is a control designation used by the Department of Homeland Security, and particularly the Transportation Security Administration. It is applied to information about security programs, vulnerability and threat assessments, screening processes, technical specifications of certain screening equipment and objects used to test screening equipment, and equipment used for communicating security information relating to air, land, or maritime transportation. The applicable information is spelled out in greater detail in 49 CFR 1520.7.

When transmitted by e-mail, SSI must be in a password-protected attachment. The password should be transmitted separately of the protected document."

6. QUESTIONS AND REQUESTS FOR ADDITIONAL INFORMATION:

All questions must be received no later than 5:00 pm, Eastern Time, July 10, 2018. The Government will respond to all questions as soon as practical.

Questions and requests for additional information shall be sent to Melanie Wilson, Contract Specialist, Office of Procurement Operations, Science & Technology Acquisition Division and Richard Simons, Contracting Officer, Office of Procurement Operations, Science & Technology Acquisition Division at robotcomms@hq.dhs.gov.